MONTHLY WEATHER REVIEW.

Editor: Prof. Cleveland Abbe. Assistant Editor: Herbert C. Hunter.

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The Monthly Weather Review summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Government Meteorologist, Kingston, Jamaica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba; Luis G. y Carbonell, Director, Meteorological Service of Cuba, Havana, Cuba; Rev. José Algué, S. J., Director of the Weather Bureau, Manila Central Observatory, Philippines; Maj. Gen. M. A. Rykachef, Director of the Physical Central Observatory, St. Petersburg, Russia; Carl Ryder, Director, Danish Meteorological Institute, Copenhagen, Denmark.

As far as practicable the time of the seventy-fifth meridian is used in the text of the Monthly Weather Review.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. E. B. Garriott, in charge of Forecast Division.

IN GENERAL.

February, 1908, was unusually stormy over the eastern half of the American Continent and, as a whole, comparatively quiet from the Rocky Mountains to the Pacific coast. The temperature averaged below normal from the Mississippi River to the Atlantic, and in California and Arizona; it was above the seasonal average from the Mississippi River over the Great Plains and the Rocky Mountain, middle, and northern Plateau districts, and on the north Pacific coast. Precipitation was in excess, except in areas in the west and northwest and in the southern Rocky Mountain region. Snow was reported on the ground thruout the month in the Rocky Mountain region and from the upper Missouri Valley over New England.

Storms from the American Continent advanced over the Atlantic on the 2d, 7th, 15th, 20th–23d, and 27th, those of the last ten days of the month being the most severe in the middle and northern latitudes of the ocean. In the Iceland area the lowest barometer of the month, 28.40 inches, was reported on the 22d. Over the British Isles pressure was high during the first decade, and was generally low and fluctuating during the balance of the month. In the vicinity of the Azores the barometer continued high, except from the 10th to the 16th, when it was relatively low in that region. Over western continental Europe the barometer was low, except in the southwest, on the 1st, 4th, 15th, and 18th to 29th. In the Asiatic area winter pressure persisted, except on the 9th, 11th, 18th, and 25th, when slight depressions appeared. On the 21st and at the close of the month readings 31.00 and 31.06 inches, respectively, were reported at Irkutsk. Reports from Nome, Alaska, were missing during a great portion of the month. Over the Hawaiian Islands pressure was high, except on the 4th, 10th, and 21st, when it was slightly below normal; from the 25th to the 29th a marked depression covered that region.

The month opened with a severe storm central over Lake Huron. This storm moved over the Canadian Maritime Provinces, with reported pressure 28.84 inches at Father Point, Quebec, on the morning of the 2d, attended by gales and snow from the Great Lakes over the North Atlantic States, reached Iceland on the 6th, with pressure 29.06 inches at the morning report, and apparently past thence over Scandinavia and northern European Russia. Following this storm an area of high barometer that had covered the western half of the American Continent and adjacent portions of the Pacific Ocean moved eastward to the Atlantic coast by the 5th, attended by freezing temperatures on the middle and east coast of the Gulf of Mexico, and by killing frost in central and light frost in southern counties of Florida on the morning of the 3d.

Closely following this high area a storm crost the continent from the 2d to 7th. This storm was severe from the 4th to 6th while crossing the central valleys and the Lake region, and on the 6th and 7th was the severest storm of the month in New England. It was attended by heavy snow from the Lake region over the Middle Atlantic and New England States. Advancing over the Canadian Maritime Provinces on the 8th the disturbance reached Iceland on the 10th, and northern European Russia on the 12th and 13th. The most extensive high area of the month advanced from the Bering Sea region to the Atlantic seaboard from the 1st to 8th, attended by the lowest temperature of the season in the Middle Atlantic States, a reading of 6° being recorded at Washington, D. C., on the morning of the 9th.

Referring to the alternations of the weather during the early portion of February the Buffalo, N. Y., News, of February 6, remarks, editorially, as follows:

> Leaving out of account the present storm as something not yet ready for the record it will be admitted on the face of the returns that western New York has had a spell of weather in the last few days. The wit who said the weather had gone into vaudeville failed only to take into his tally the tragedy of blizzards and Arctic waves. In the past two weeks cold waves, snowstorms and high winds, and gales have followed each other in rapid succession and Buffalo has had more than her share of the snow, about 26 inches having fallen during Saturday, Sunday, and

Monday, with zero temperature accompanied by winds with almost hurricane force, a velocity of 76 miles an hour being reached February 1. These conditions have called for special caution on the part of shippers of perishable goods, railroads, and the traveling public; and the warnings from the Weather Bureau have amply served to prepare all concerned for the changes in advance of their coming. Each important characteristic of weather conditions has been heralded at least thirty-six hours in advance, thereby saving much property and probably many lives. * * The local Weather Bureau office has performed a signal service during the past severe weather. Its predictions of the big storms of last week and this have been well worth all the Bureau costs in a year.

The third barometric depression of the month moved slowly from the Pacific to the Atlantic coasts from the 8th to 15th, attended by mild temperature and heavy rains that resulted in floods in the central valleys and the Eastern States. Crossing the Canadian Maritime Provinces during the 16th this depression entered an extensive low barometer area that covered the higher latitudes of the north Atlantic Ocean from the 18th until the close of the month. During the passage of this disturbance over the interior of the United States tornadic storms were reported on the 14th in Texas and Mississippi, and severe windstorms were experienced on the Lakes and Atlantic coast during its passage over the eastern districts. From the 16th to 20th a disturbance crost the American Continent, attended by heavy snow and gales from the upper Mississippi Valley eastward, and followed by a moderate cold wave that carried the line of frost to the middle Peninsula of Florida. From the 23d to 26th a barometric depression advanced from the British Northwest Territory to the Atlantic coast with general precipitation from the Rocky Mountains eastward and gales on the Great Lakes and the Atlantic and Gulf coasts. This depression was followed by a cold wave that produced the lowest temperatures of the season in southeastern Florida, freezing temperature being reported in Dade County on the 28th.

During the closing days of the month barometric pressure decreased over the western portion of the United States, and by the 29th unsettled weather had set in generally thruout the central valleys and thence westward to the Pacific coast.

BOSTON FORECAST DISTRICT.*

[New England.]

The month as a whole was cold and stormy. The coast was swept by several severe storms, the most severe of which was the one of the 6–7th. There was considerable snow in the first decade, and the minimum temperatures of the month occurred generally on the 5th. While there was much delay and inconvenience to shipping from stress of weather, there was no great damage to vessels or to shore property.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*

[Louisiana, Texas, Oklahoma, and Arkansas.]

Precipitation was generally excessive and temperature as a rule above the normal. No extensive cold wave occurred and no general storm visited the Gulf coast. Frost or freezing temperature warnings were issued for all injurious temperature conditions.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*

[Kentucky and Tennessee.]

The month was stormy, with an excess of precipitation and no very cold weather. Cold-wave warnings were ordered on the 1st in advance of the cold weather of the first three days, when the lowest temperature of the month occurred.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

No sweeping cold waves occurred. Advisory messages for high winds were issued to open ports on Lake Michigan. No Lake casualties have been reported. The principal feature of the weather conditions in the district was the occurrence of heavy rains and snows attending the movement of four different storms, the most severe of which occurred in the latter part of the second decade of the month. Warnings were issued in advance of these storms as far as possible, and it is thought that the forecasts were of great service.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

There were a few cold snaps of brief duration and heavy snowfalls of a local character, but the prevailing weather was fine—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

The month as a whole was one of pleasant weather, with a normal amount of rain. During the middle of the month the weather was generally clear and pleasant owing to the existence of a marked high area. Some moderately heavy frosts occurred and ample warnings were issued in all cases. The month closed with a severe storm.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

The month was unusually quiet and only two storms of note crost the district, one on the 5th and the other on the 26th. Timely warnings were issued. No cold waves occurred.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

Winter and spring storms from the southwest that move northeastward from New Mexico and Texas thru the Ohio Valley, the lower Lake region, and the St. Lawrence Valley are usually attended by heavy rains and abnormally high temperatures over the east and south quadrants. These rains almost invariably cause severe floods in the rivers, particularly in the Ohio and its tributaries, and they are frequently much increased in magnitude by the additional volume of water from the melting of the snows that have accumulated since the last thaw. In fact it often happens that the melting of the accumulated snow contributes more to the flood volume than does the rainfall resulting from the storms.

The storm of February 13–16, 1908, was no exception to the general rule. On the night of February 10 there were from 3 to 18 inches of snow over the upper Ohio watershed with a water equivalent of about 20 per cent of the actual depth, the greatest amount being over the Allegheny River watershed. This snow began to melt on the 12th, under the influence of warm southerly winds caused by a depression to the northwestward, and preliminary advices were issued on that day from the Central Office at Washington to the effect that warm rains would cause rapid melting of the snows over the upper Ohio Valley and the Middle Atlantic States with a probability of high waters and the breaking up of ice.

Specific warnings from the district centers began on the 13th and 14th, and during the 15th they were extended to the Atlantic coast.

To give in detail the history of the floods would simply mean a repetition of the history of past floods with the single, altho extremely significant, exception that never before had a flood of such magnitude prevailed over the Ohio Valley without loss of human life, and with so little loss and damage to property. It was freely admitted in this connection that this happy condition of affairs had been made possible by the timely and accurate warnings of the Weather Bureau. Practically nothing movable was damaged, but the damage to what could not be moved amounted to several millions of dol-

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.